

(12) **United States Patent**
Wang

(10) **Patent No.:** **US 9,046,215 B2**
(45) **Date of Patent:** **Jun. 2, 2015**

(54) **SUPPORT DEVICE**

(71) Applicants: **Inventec (Pudong) Technology Corporation**, Shanghai (CN); **INVENTEC CORPORATION**, Taipei (TW)

(72) Inventor: **Jhao-Ming Wang**, Taipei (TW)

(73) Assignees: **INVENTEC (PUDONG) TECHNOLOGY CORPORATION**, Shanghai (CN); **INVENTEC CORPORATION**, Taipei (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 116 days.

(21) Appl. No.: **13/765,221**

(22) Filed: **Feb. 12, 2013**

(65) **Prior Publication Data**

US 2014/0117175 A1 May 1, 2014

(30) **Foreign Application Priority Data**

Oct. 31, 2012 (CN) 2012 1 0429490

(51) **Int. Cl.**
F16M 11/18 (2006.01)
F16M 11/04 (2006.01)
F16M 11/10 (2006.01)
F16M 13/00 (2006.01)

(52) **U.S. Cl.**

CPC **F16M 11/041** (2013.01); **F16M 11/105** (2013.01); **F16M 13/00** (2013.01)

(58) **Field of Classification Search**

CPC **F16M 11/041**; **F16M 11/105**; **F16M 13/00**
USPC **248/176.3**, **671**, **371**, **398**, **138**, **139**,
248/140, **13**; **108/8**

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,295,680	A *	2/1919	Benson	108/4
4,928,914	A *	5/1990	Snodell	248/284.1
4,947,763	A *	8/1990	Piorek	108/8
5,460,104	A *	10/1995	Young, Sr.	108/115
6,227,518	B1 *	5/2001	Sun	248/371
8,087,629	B2 *	1/2012	Gotovac	248/299.1
8,505,470	B1 *	8/2013	Lira	108/138
8,708,298	B2 *	4/2014	Hu et al.	248/371

* cited by examiner

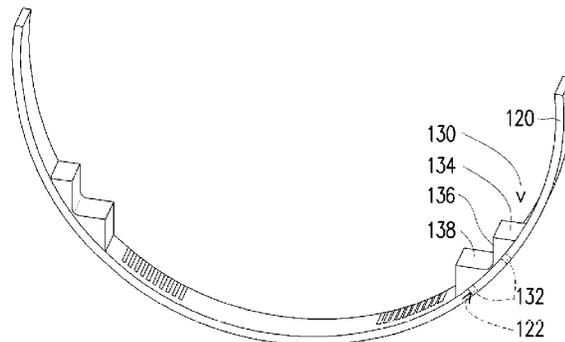
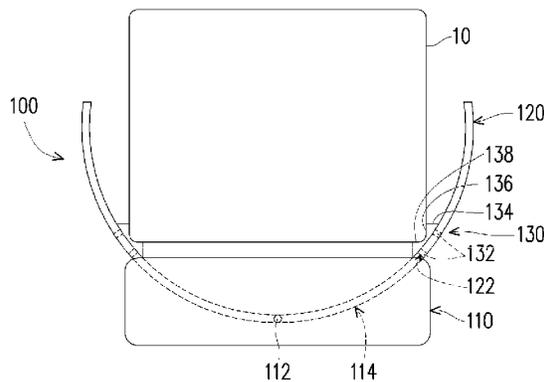
Primary Examiner — Anita M King

(74) *Attorney, Agent, or Firm* — Morris Manning & Martin LLP; Tim Tingkang Xia, Esq.

(57) **ABSTRACT**

A support device, applicable for holding up an electronic device in different directions, the support device includes a base and a curved sliding bracket. The base includes a fixing part. The curved sliding bracket is slidably assembled on the base in a curve direction. The electronic device is adapted for being fixed on the curved sliding bracket. The base includes a sliding rail, where the curved sliding bracket is assembled.

8 Claims, 12 Drawing Sheets



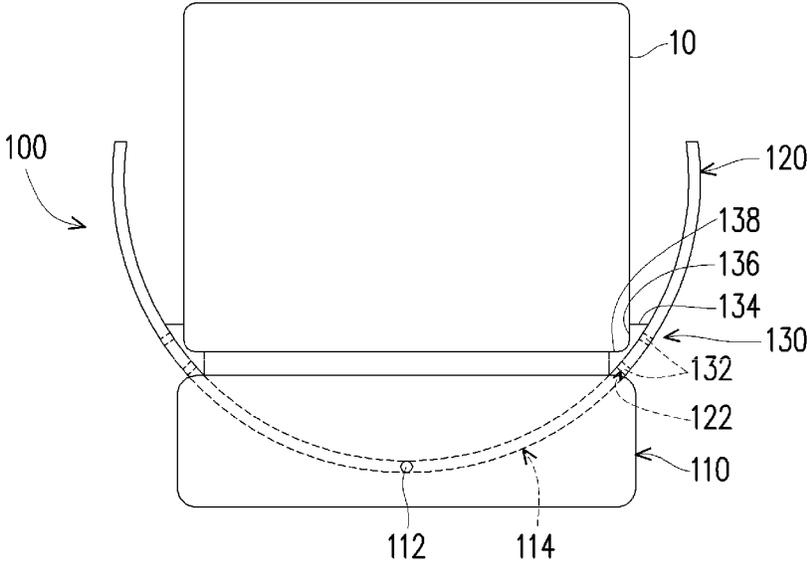


FIG. 1A

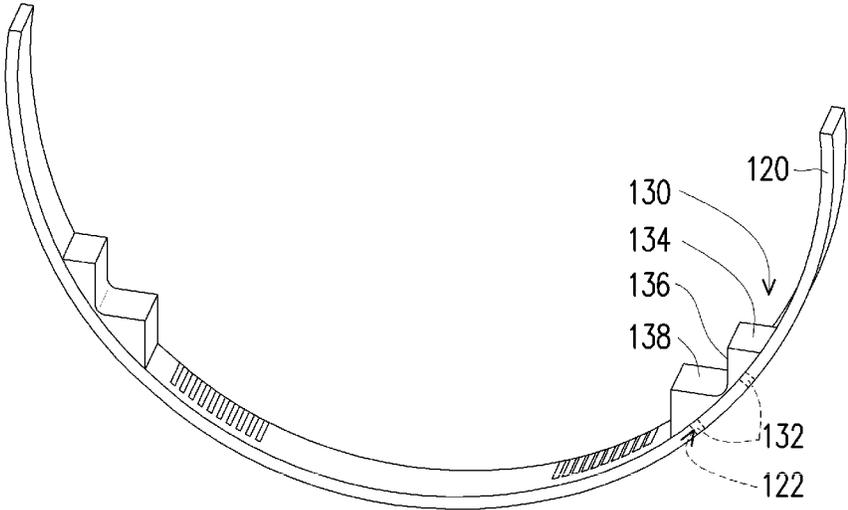


FIG. 1B

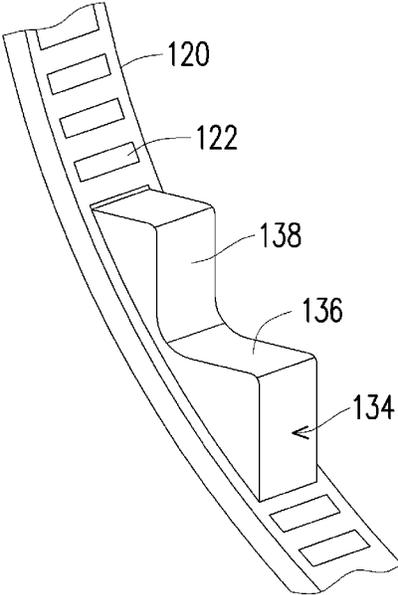


FIG.1C

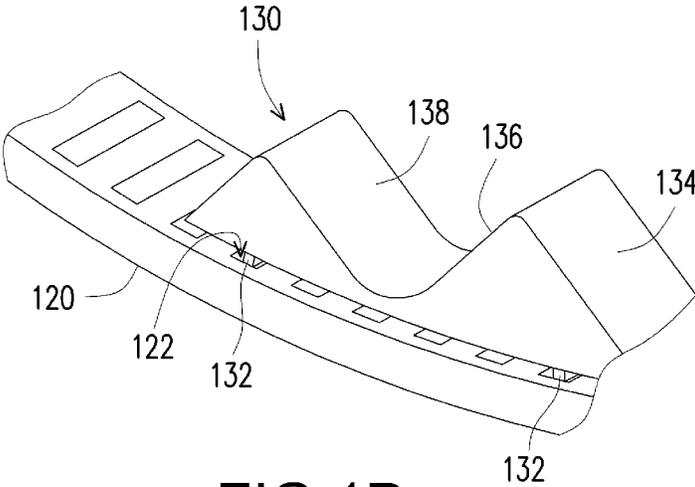


FIG.1D

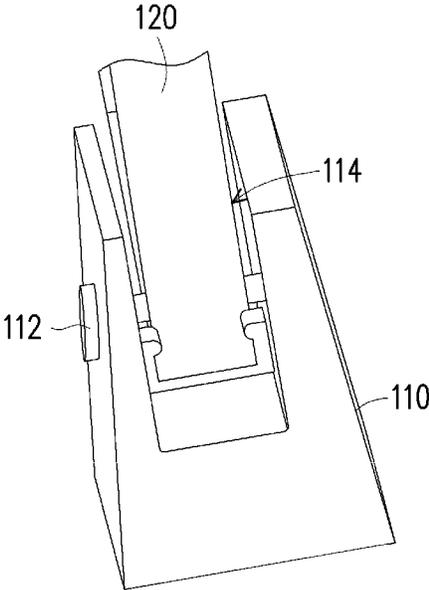


FIG. 1E

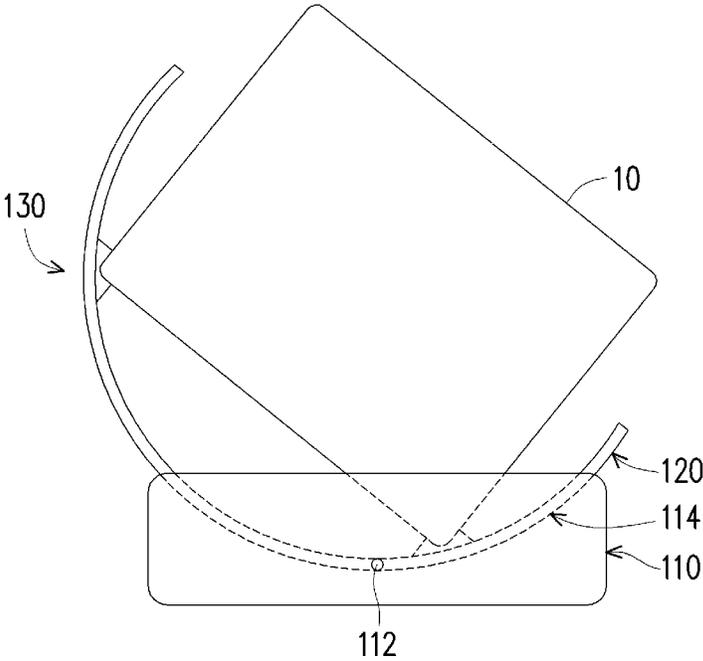


FIG.1F

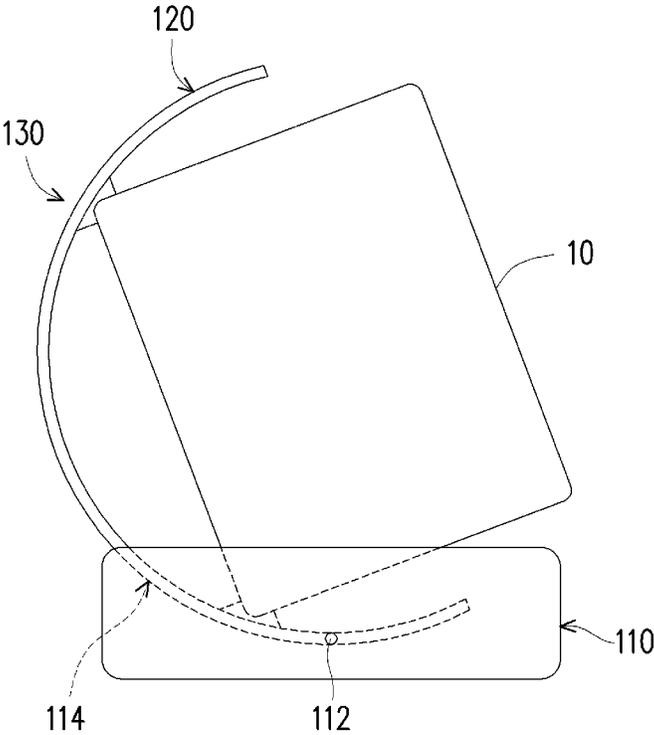


FIG.1G

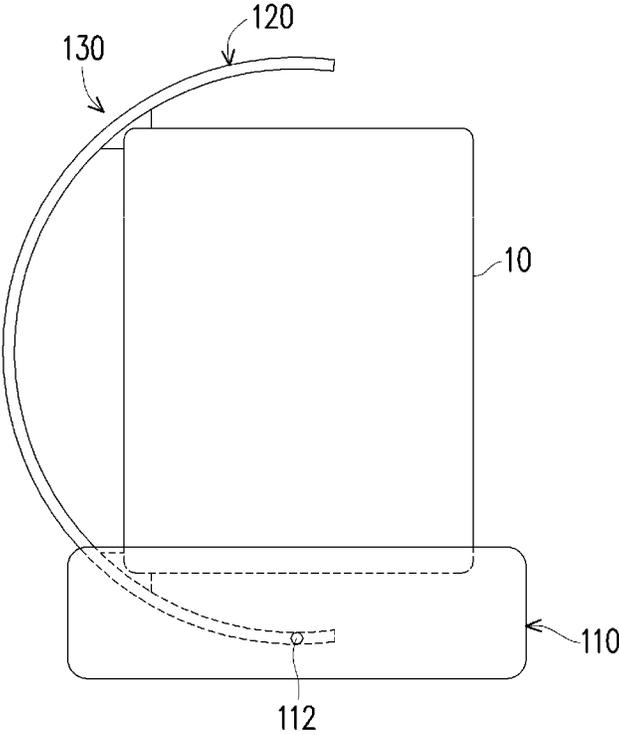


FIG.1H

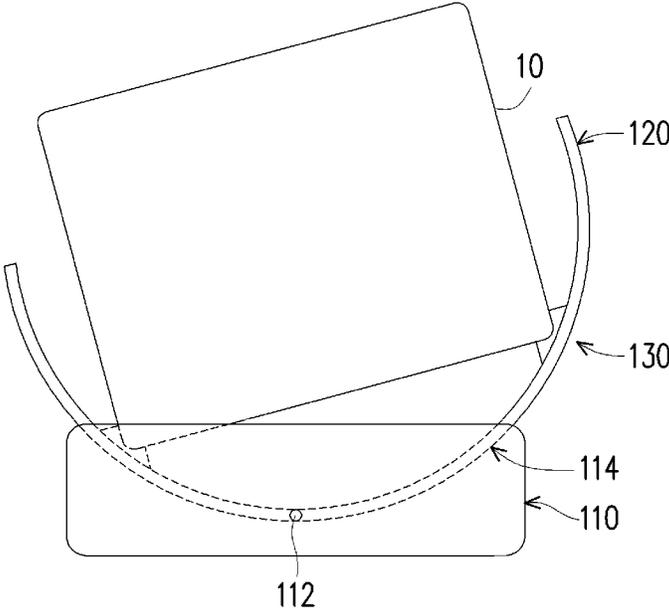


FIG. 1I

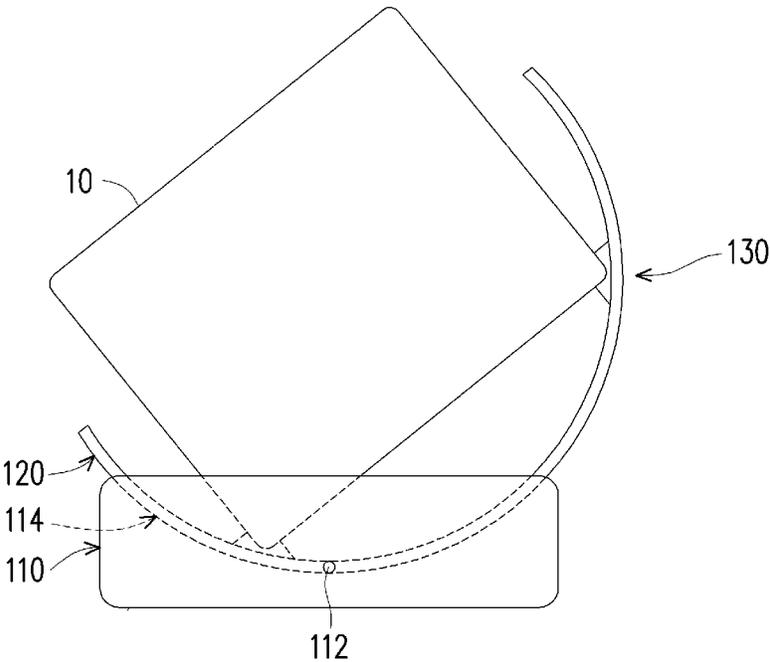


FIG. 1J

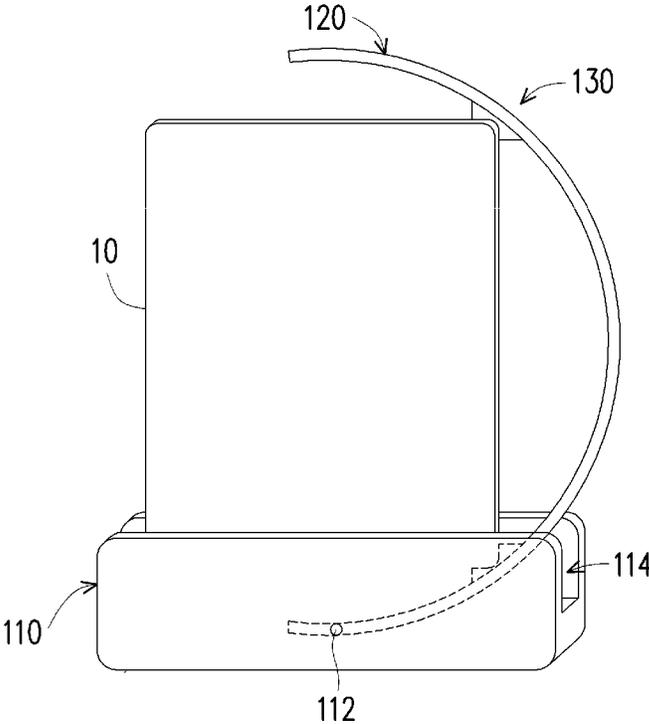


FIG. 1K

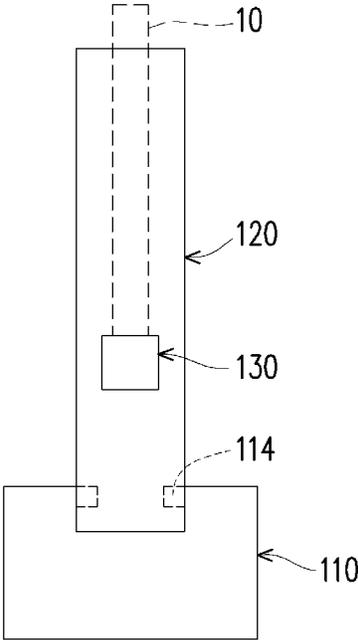


FIG.1L

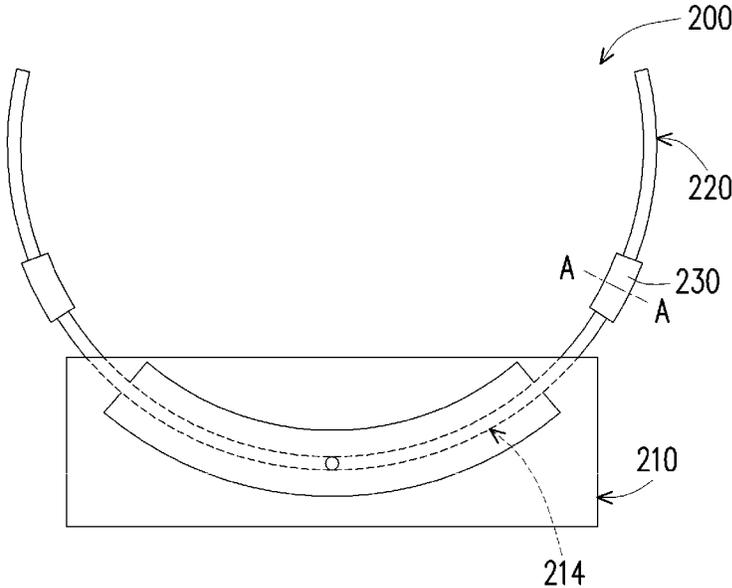


FIG. 2A

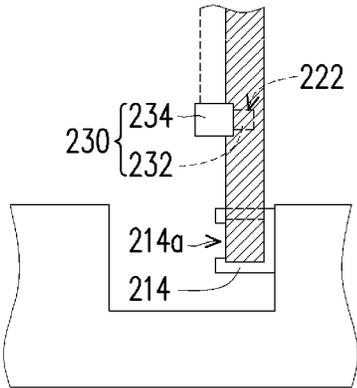


FIG. 2B

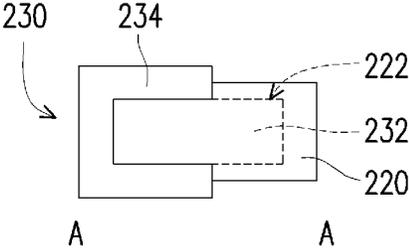


FIG.2C

1

SUPPORT DEVICECROSS-REFERENCE TO RELATED
APPLICATIONS

This non-provisional application claims priority under 35 U.S.C. §119(a) on Patent Application No(s). 201210429490.8 filed in China on Oct. 31, 2012, the entire contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Technical Field of the Invention

This disclosure relates to a support device, and in particularly to a support device enabling an electronic device to be erected in different directions.

2. Description of the Related Art

In today's information age, mankind's dependence on electronic devices is increasingly growing. Electronic devices are designed to be lighter and thinner gradually so as to be portable for users. Therefore, smart phones, tablet computers and other electronic devices have become the mainstream and an indispensable tool in people's modern life.

Currently, when viewing the screen of an electronic device, users need to hold it by hand, which is inconvenient for long-time viewing. Although a number of supporting devices are available now in the market, most of them can support electronic devices in only one position (e.g. only in a vertical or a longitudinal position) as most screens of electronic devices are rectangular, so it is hard to meet the demand users for viewing from different positions.

SUMMARY OF THE INVENTION

An embodiment of the disclosure provides a support device applicable for holding up an electronic device in different directions. The support device comprises a base and a curved sliding bracket. The base includes a fixing part. The curved sliding bracket is slidably assembled on the base in a curve direction. The electronic device is adapted for being fixed on the curved sliding bracket. The base includes a sliding rail, where the curved sliding bracket is assembled.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosure will become more fully understood from the detailed description given herein below for illustration only, and thus does not limit the disclosure, wherein:

FIG. 1A is a schematic view of a support device holding up an electronic device in an embodiment of the disclosure;

FIG. 1B is a schematic view of a curved sliding bracket and clamps of the support device in FIG. 1A;

FIG. 1C is a partial enlarged view of FIG. 1B;

FIG. 1D is a partial enlarged view of FIG. 1C;

FIG. 1E is a side view of a fixing part and the curved sliding bracket of the supporting device in FIG. 1A;

FIG. 1F to FIG. 1H show the process of the curved sliding bracket of the support device sliding counterclockwise in FIG. 1;

FIG. 1I to 1K show the process of the curved sliding bracket of the support device sliding clockwise in FIG. 1;

FIG. 1L is a side view for the support device in FIG. 1A;

FIG. 2A is a schematic view of a support device according to another embodiment of the disclosure;

FIG. 2B is a side view of the support device in FIG. 2A; and

2

FIG. 2C is a sectional view of the support device along a line A-A in FIG. 2A.

DETAILED DESCRIPTION

In the following detailed description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the disclosed embodiments. It will be apparent, however, that one or more embodiments may be practiced without these specific details. In other instances, well-known structures and devices are schematically shown in order to simplify the drawing.

A support device **100** of this disclosure is applicable for holding up an electronic device **10** in different positions. FIG. 1A is a schematic view of a support device holding up an electronic device in one of the embodiments of this disclosure. Please refer to FIG. 1A, the support device **100** in this disclosure comprises a base **110** and a curved sliding bracket **120**. The base **110** comprises a fixing part **112** and a sliding rail **114**. In this embodiment, the sliding rail **114** is assembled in a curve direction. The curved sliding bracket **120** is slidably assembled in the sliding rail **114**, to slide left and right along the inner outline of the sliding rail **114**. In this embodiment, the electronic device **10** is a tablet computer, but in other embodiments, the electronic device **10** is a smart phone and so on.

FIG. 1B is a schematic view of for the curved sliding bracket and clamps of the support device in FIG. 1A; FIG. 1C is a partial enlarged view of FIG. 1B; and FIG. 1D is a partial enlarged view of FIG. 1C. Please refer to FIG. 1B to FIG. 1D, in this embodiment, the support device **100** further comprises a couple of clamps **130**. Each of the clamps **130** includes a first embedded part **132**. The curved sliding bracket **120** includes a plurality of second embedded parts **122** corresponding to the first embedded parts **132**. The clamps **130** are retained on one of the plurality of second embedded parts **122** via the first embedded parts **132**, so as to be fixed on the curved sliding bracket **120**.

In this embodiment, the first embedded part **132** is a protruding piece which is adapted for being adjustably fixed to the second embedded part **122**. The plurality of second embedded parts **122** are holes. Users can choose which the plurality of second embedded parts **122** the first embedded parts **132** will be fixed depending on the dimension of the electronic device **10** that is to be placed. If the dimension of the electronic device **10** is small, users can adjust the distance between the first embedded parts to be shorter, that is, fix the first embedded parts **132** at the lower positions in FIG. 1A. On the other hand, if the dimension is big, users can fix the couple of first embedded parts **132** at the upper positions in FIG. 1A, that is, the distances between the clamps **130** becomes bigger. Certainly, in other embodiments, the clamps **130** are fixed to the curved sliding bracket **120** in a locking or a gluing way, and the ways of fixing the clamps **130** to the curved sliding bracket **120** are not limited to this embodiment.

In addition, as shown in FIG. 1C, the clamps **130** respectively include an elastic part **134**, made of rubber or a plastic material. The elastic part **134** includes a first surface **136** and a second surface **138**. In this embodiment, the first surface **136** is substantially perpendicular to the second surface **138**. The distance between the clamps **130** can be slightly less than the width of the electronic device **10**. When placed on the clamps **130**, the electronic device **10** slightly expands the elastic parts **134** of the clamps **130**, so as to be clamped tightly by the clamps **130**. At this moment, both the first surface **136** and the second surface **138** of the elastic part **134** contact the

electronic device **10** and limit the electronic device **10** to only move in the normal directions of the first surface **136** and the second surface **138**.

FIG. 1E is a side view of the fixing part and the curved sliding bracket of the supporting device in FIG. 1A. Please refer to FIG. 1E, in this embodiment, the fixing part **112** is a pushbutton. When the curved sliding bracket **120** is moved to a certain position relative to the base, users can push the fixing part **112** to a fixed position, so that the fixing part **112** may stretch into the sliding rail **114** and support the curved sliding bracket **120**. Therefore, the curved sliding bracket **120** may not slide relative to the base **110**, and thus the position of the electronic device **10**, relative to the base **110**, may be fixed. Certainly, the above-mentioned type of the fixing part **112** is not limited to this embodiment. In other embodiments, the fixing part **112** is a knob, which is adapted for stretching into the sliding rail **114** by turning so as to support and to fix the curved sliding bracket **120**. Certainly, the fixing part **112** may also be other elements inserted into the gap between the fixing part and the sliding rail **114** to increase the friction between them.

Conversely, if the curved sliding bracket **120** is needed to slide relative to the base **110**, the fixing part **112** is required to move to a release position. In this embodiment, the fixing part **112** is withdrawn or ejected from the sliding rail **114** only by pressing it again, in order to release the pressure upon the curved sliding bracket **120**. In this way, the curved sliding bracket **120** is adapted for sliding relative to the base **110**, thereby changing the position of the electronic device **10** relative to the base **110**. In FIG. 1A, the electronic device **10** is placed horizontally on the support device **100**; if upright viewing the screen is needed, users can move the fixing part **112** to the release position, then change the position of the electronic device **10** with following ways. FIG. 1F to FIG. 1H show processes of the curved sliding bracket of the support device sliding counterclockwise. Please refer to FIG. 1F to FIG. 1H, users can change the position of the electronic device **10** to an upright position, relative to the base **110**, by turning the curved sliding bracket **120**. Alternatively, when another different viewing angle is needed, users can also maintain the electronic device **10** at the position of FIG. 1F or FIG. 1G. When the electronic device **10** is moved to the certain direction, the position of the curved sliding bracket **120**, relative to the base **110**, is fixed only by pressing the fixing part **112** again, that is, the electronic device **10** is retained to be viewed, without holding it by hand.

In view of some electronic devices **10** provided with keys or touch buttons at the edges of screen, users may differentiate the upright mode and the upside-down mode of the electronic device **10**, even both modes are identified as a vertical mode, for example, when operated in the upright mode, the buttons are located below the screen, or the buttons are above the screen when operated in the upside-down mode. For the support device in this embodiment, the position of the electronic device **10** may be freely switched among the vertical direction (upright), the horizontal direction and the vertical direction (upside-down). In addition to the way of sliding the sliding bracket **120** counterclockwise, like the mode in FIG. 1F to 1H, the user can use another mode as follows. FIG. 1I to 1K show the processes of the curved sliding bracket of the support device sliding clockwise in FIG. 1A. Please refer to FIG. 1I to FIG. 1K, the users can slide the sliding bracket **120** clockwise relative to the base **110**, until the sliding bracket **120** is moved to the position in FIG. 1K. When the electronic device **10** is moved to the certain position, the position of the curved sliding bracket **120**, relative to the base **110**, may be

fixed only by pressing the fixing part **112** again, that is, the electronic device **10** is retained.

FIG. 1L is a side view of the support device in FIG. 1A; FIG. 2A is a schematic view of a support device according to an embodiment of the disclosure; and FIG. 2B is a side view of the support device in FIG. 2A. Please refer to FIG. 1L to FIG. 2B, the difference between the support device **200** in FIG. 2A and the support device **100** of FIG. 1A lies in that, in FIG. 1L, the clamps **130** are located on the curved sliding bracket **120**. However, in FIG. 2B, the clamps **230** are located on the side of the curved sliding bracket **220**. Therefore, the electronic device **10** is disposed above the curved sliding bracket **120** when placed on the support device **100** in FIG. 1A, whereas the electronic device **10** is disposed at a lateral side of the curved sliding bracket **220** when placed on the curved sliding bracket **220** of FIG. 2A.

Moreover, when the curved sliding bracket **220** slides relative to the base **210**, the clamps **230** may run into the sliding rail **214**, leading to unsuccess of smooth rotation at times. As shown in FIG. 2B, in this embodiment, in order to solve the above-mentioned problem, the sliding rail **214** of the base **210** includes a side gap **214a**. When the curved sliding bracket **220** slides relative to the base **210**, the clamps **230** pass through the side gap **214a** without running into the sliding rail **214**.

FIG. 2C is a sectional view of the support device along a line segment A-A in FIG. 2A. Please refer to FIG. 2C, in this embodiment, the clamps **230** are inserted into the curved sliding bracket **220** at a lateral direction, that is, the second embedded parts **222** of the curved sliding bracket **220** are arranged laterally, in order to accommodate the first embedded parts **232**. Additionally, the elastic parts **234** partially cover the first embedded parts **232**. In this embodiment, the portions of the first embedded parts **232** that are not covered by the elastic parts **234** are inserted to the second embedded parts **222** of the curved sliding bracket **220**, while the covered portions of the first embedded parts **232** are adapted for clamping the electronic device **10**.

To sum up, the electronic device is clamped between the elastic parts of the couple of clamps, and the first embedded part of the clamp is fixed to the second embedded part of the curved sliding bracket, so that the electronic device is applicable for being detachably fixed on the curved sliding bracket. The curved sliding bracket, slidably assembled on the sliding rail of the base, is adapted for sliding relative to the curve of the base. Users can adjust the curved sliding bracket to a certain position, then the fixing part is stretched into the sliding rail and support the curved sliding bracket, so as to fix the relative positions of the curved sliding bracket and the base, and thus the electronic device is held up in several positions (e.g., upright, upside-down or horizontal position), so as to meet the demand of users for viewing the electronic device located at different positions. Furthermore, users can fix the first embedded part to the second embedded part of the curved sliding bracket with a corresponding size, depending on the dimensions of the electronic device, so as to adjust the distance between the clamps. In this way, the support device of this disclosure may be used for electronic devices with various dimensions.

What is claimed is:

1. A support device, applicable for holding up an electronic device in different directions, the support device comprising:
 - a base including a fixing part;
 - a couple of clamps, each of the clamps including a first embedded part; and
 - a curved sliding bracket slidably assembled on the base in a curve direction and including at least one second

5

embedded part corresponding to each first embedded part, the clamps being retained on the at least one second embedded part respectively via the first embedded part so as to be fixed on the curved sliding bracket, the electronic device being adapted for being fixed on the curved sliding bracket, wherein the base includes a sliding rail, where the curved sliding bracket is assembled.

2. The support device according to claim 1, wherein each of the clamps includes a first surface and a second surface, wherein when the electronic device is fixed on the curved sliding bracket, both the first surface and the second surface contact the electronic device and limit the electronic device to move in the normal direction of the first surface and the normal direction of second surface.

3. The support device according to claim 2, wherein each of the clamps includes an elastic part partially covering the first embedded part, and each of the elastic parts including the first surface and the second surface.

4. The support device according to claim 2, wherein in each of the clamps, the first surface is substantially perpendicular to the second surface.

6

5. The support device according to claim 1, wherein the number of the at least one second embedded part is plural, the plurality of first embedded parts are protruding pieces, the plurality of second embedded parts are holes, and each of the plurality of first embedded parts is adapted for being adjustably fixed to one of the plurality of second embedded parts.

6. The support device according to claim 1, wherein the base includes a side gap, when the curved sliding bracket slides relative to the base, the clamps pass through the side gap.

7. The support device according to claim 1, wherein when the fixing part includes a pushbutton or a knob, the pushbutton or the knob is adapted for pushing or turning the fixing part to move to a fixed position, so as to stretch into the sliding rail and to support the curved sliding bracket.

8. The support device according to claim 7, wherein the sliding rail is assembled in the curve direction.

* * * * *